

Past and present distribution of *Acipenser sturio* L., 1758 in Russia, and problems involving its restoration

I. A. Barannikova¹ and J. Holčík²

¹ Physiological Institute, St. Petersburg University, Universitetskaya naberezhnaya 7/9, 199034 St. Petersburg, Russia.
E-mail: epl@it4257.spb.edu

² Institute of Zoology, Slovak Academy of Sciences, Dúbravská cesta 9, 842 06 Bratislava, Slovak Republic

Received September 1999. Accepted June 2000.

ABSTRACT

The Atlantic sturgeon *Acipenser sturio* L., 1758 has always been rare in Russia. Its main distribution was concentrated in the Gulf of Finland, from which it ascended the Neva River and entered Lake Ladoga and some of its tributaries. The landlocked population of this species was known in Lake Ladoga. In the 20th century, there are recorded catches of only 25 adult and 12 juvenile specimens. Since the last specimen was caught in 1985, the Atlantic sturgeon can be considered as extirpated in the water bodies of Russia. While recovery plans have been drawn up, the lack of living specimens is a serious obstacle to re-establishing this population.

Key words: Gulf of Finland, Lake Ladoga, landlocked population, recovery plans.

RESUMEN

Distribución pasada y presente de *Acipenser sturio* L., 1758 en Rusia, y problemas relativos a su recuperación

El esturión atlántico *Acipenser sturio* L., 1758 ha sido siempre raro en Rusia. Su distribución principal se concentraba en el golfo de Finlandia, desde donde ascendía por el río Neva y entraba en el lago Ladoga y en algunos de sus afluentes. Una población aislada de esta especie era conocida del lago Ladoga. En el siglo XX se recogen capturas de sólo 25 ejemplares adultos y 12 juveniles. Desde que el último ejemplar fue capturado en 1985, el esturión atlántico puede ser considerado como extinguido de las aguas de Rusia. Aunque los planes de recuperación han sido preparados, la falta de ejemplares vivos es un serio obstáculo para el restablecimiento de esta población.

Palabras clave: Golfo de Finlandia, lago Ladoga, población aislada, planes de recuperación.

INTRODUCTION

In the water bodies of the Russian Federation, the Atlantic sturgeon *Acipenser sturio* L., 1758 was always rare, as documented by records of all known specimens taken from the literature. The following information summarises the past and present situation of this species in Russia, with regard to its possible recovery.

PAST OCCURRENCE

In the waters of Russia, the Atlantic sturgeon was known only from the easternmost part of the Baltic Sea, the Gulf of Finland. As can be determined from the data presented by Kessler (1864) and Berg (1948a), this species has always been rare in this region. According to Kessler (1864, p. 211): "In the Gulf of Finland the sturgeon is rather rare; however, each year in small numbers it penetrates into the Neva River and from there it goes further into Lake Ladoga and rivers entering it, such as the Volkhov, Syas, Svir', and formerly, when the Voksha River had enough water, it occurred also in the mouth of this rivulet." Kessler also mentioned the catch of a large (13 *puds*; 212.9 kg) female Atlantic sturgeon taken in the Neva River near Matisovi Island on 16 June 1851, containing 5 *puds* (81.9 kg) of eggs.

As shown in table I, this species became extremely rare in both the Gulf of Finland and the Neva River during the 20th century. It is noteworthy that only single and exclusively adult specimens were caught. Available data also show that the Atlantic sturgeon was not part of the fish catch by

the mid-1940s. Since that time, it could be considered as extirpated in the Gulf of Finland. This is also indirectly proven by the total absence of sturgeon in the fish catch of the Neva River. This phenomenon may be explained not only by the overfishing, but also by increasing pollution, especially of the Neva.

The Atlantic sturgeon was more common in Lake Ladoga, which is connected to the Gulf of Finland by the Neva River. Table II illustrates that large sturgeons were caught, mainly in the southern part of Lake Ladoga, especially in Volkhov Bay. According to Kessler (l.c.) the sturgeon entered the Volkhov River from this part of Lake Ladoga annually in June, and migrated upstream as far as the villages of Zvankoya and Duboviki. More upstream migration was blocked by rapids above Duboviki, 27 km from the mouth of the Volkhov River. Spawning was observed each year in the Volkhov River between these villages, where the river is deep, the river beds covered with pebbles, and the water has high current velocity, thus creating all of the necessary conditions for reproduction. Spawning occurred in June (Kessler, l.c.) and also in July (Berg, 1948b). Kessler (l.c.) also writes that juveniles appeared in the mouth of the Volkhov River in July and August. Because the Volkhov River is the only tributary of Lake Ladoga where the Atlantic sturgeon are known to have spawned, Kessler proposed a total ban on the fishery in this region, thereby becoming the world's first author to propose the conservation of this species.

In Lake Ladoga, sturgeons of different sizes, including juveniles, were caught (table III). Because of this, Berg (1948b) suggests that this area contained a landlocked form of this species, which did

Table I. Documented records of Atlantic sturgeon catches in the Gulf of Finland and the Neva River during the 20th century

Locality	Date	Weight (kg)	Total length (m)	Author
Gulf of Finland				
Near Sestroreck	30 May 1934	177	2.8	Anon., 1934
–	1938	56	2.19	Berg, 1948a
Luga Bay at Lipov	July 1935	36.5	?	Berg, 1935
Neva River				
Neva River	June 1930	"large"	?	Pravdin, 1948, 1949
–	July 1932	36	1.88	Berg, 1935
Liteinyi bridge	May 1935	96	2.29	Berg, 1948a
–	June 1935	?	2.2	Berg, 1935
Malaya Nevka mouth	June 1944	77	?	Berg, 1948b

Table II. Documented records of Atlantic sturgeon adults caught in Lake Ladoga during the 20th century

Locality	Date	Weight (kg)	Total length (m)	Author
North-western sector				
–	December 1913	61	2.6	Jääskelainen, 1917
North-eastern sector				
–	Autumn 1918	64	?	Berg, 1935
–	June 1947	22.5	1.63	Pravdin, 1948, 1949
Olonka River mouth	Spring 1957	Large	?	Kuderskii, 1983
Western sector				
Burnaya River mouth	October 1925	24	?	Berg, 1935
–	June 1948	16.5	1.35	Pravdin, 1948
South-western sector				
–	1923	37	?	Domrachev and Pravdin, 1926
–	1923	21	?	Pravdin, 1948
–	Winter 1948	Large	?	Barysheva and Bauer, 1957
Southern sector				
–	May 1939	130	2.83	Berg, 1948
–	June 1952	73	2.22	Malashkin (pers. comm.)
–	June 1954	106	?	Vasil'ev and Reznikov, 1955
Volkhov Bay				
–	June 1930	128	2.65	Berg, 1948
–	June 1930	Large	?	Pravdin, 1949
Volkhov River mouth	July 1957	Spent female	?	Vasil'ev and Reznikov, 1955
–	July 1969	52	?	Boyarskaya (pers. comm.)
–	June 1984	26	1.55	Podushka, 1985

not enter the Gulf of Finland. Indirect evidence supporting this hypothesis is the discovery of the remains of 60 large Atlantic sturgeon, dating from the 8th-9th century, in the Staraya Ladoga on the Volkhov River. These fossils are from sturgeons measuring 1.7-3.1 m, but mostly 2.1-2.8 m, with a mean weight of approximately 100-180 kg and an age of up to 35-36 years (Berg, 1948a, b). Nevertheless, parasitological data indicate that at least part of the sturgeons migrated to Lake Ladoga from the Baltic Sea through the Neva River (Barysheva and Bauer, 1957).

PRESENT STATUS

As shown in tables II and III, the most frequent occurrence of Atlantic sturgeon adults and juveniles in Lake Ladoga was during the periods from 1939 to 1957 and 1930 to 1935. Since that time, the

catch records of this species indicate that only two adults were caught: one in 1969 and one in 1984. This means that during the past 16 years, there were no records of Atlantic sturgeon in Lake Ladoga. In the Gulf of Finland this species has been unknown since 1938, or 1944 if one specimen caught in the Neva River is considered. Thus, it can be assumed that the Atlantic sturgeon is extirpated in this region. Since 1967 there has been a ban on the fishing of this species and it is included in the Red Data Book of both the former USSR (Borodin, Bannikov and Sokolov, 1984) and Russia.

RECOVERY PLANS

To save this species, special and effective measures are needed. The restoration programme for the Atlantic sturgeon in Russia is planned, although, at present, this species is in the most diffi-

Table III. Documented records of Atlantic sturgeon juveniles in Lake Ladoga and the Volkhov River during the 20th century (modified from Kuderskii, 1983)

Locality	Date	Weight (kg)	Total length (m)	Author
North-western sector				
–	July 1910	0.325	0.43	Jääskäläinen, 1917
–	July 1910	0.350	0.43	Jääskäläinen, 1917
Northern sector				
–	Summer 1934	4.9	–	Persov, 1935
Eastern sector				
–	July 1933	5.0	?	Persov, 1935
–	June 1934	5.5	?	Berg, 1935
South-western sector				
–	1935	4.0	?	Persov, 1935
–	1934	8.0	?	Berg, 1935
–	1934	8.0	?	Berg, 1935
–	1934	small	?	Berg, 1935
Volkhov Bay				
–	June 1930	?	0.49	Berg, 1948
Volkhov River				
–	June 1924	4.0	?	Domrachev and Pravdin, 1926
–	Autumn 1924	?	0.25	Domrachev and Pravdin, 1926

cult situation among all endangered species of fish, because of a complete lack of living specimens. At the laboratory of the senior author, in the 1990s, the long-term Programme of Sturgeon Biodiversity Conservation was created, including the formation of live collections and a gene-pool bank of cryopreserved sperm (Barannikova, 1998; Artyukhin, Barannikova and Romanov, 1999). The next approach for sturgeon conservation is the establishment of special fish farms in different parts of Russia for rare sturgeon. Near Moscow, a new fish farm has been constructed for the central collection of rare sturgeon species. Atlantic sturgeon has been proposed for the central collection on the new Mozhaysk fish farm (Artyukhin and Romanov, 2000). In order to try and find living specimens of the Atlantic sturgeon, special leaflets containing its description were produced and distributed among fishermen in the Baltic and Ladoga basins; the necessity of the preservation of living sturgeons was stressed. In the last few years, we have received some information about catches of sturgeon in the Volkhov Bay of Lake Ladoga, but these fishes were not *A. sturio*, but rather the sterlet *Acipenser ruthenus*

L., 1758 or the Russian sturgeon *Acipenser gueldenstaedtii* Brandt & Ratzeberg, 1833.

Considering the present worldwide situation of the Atlantic sturgeon, in order to rescue this critically endangered species, the joint effort of experts from different countries is necessary.

REFERENCES

- Anon. 1934. Stor stör. *Fiskeritidskrift for Finland* 4: p. 112.
- Artyukhin, E. N., I. A. Barannikova and A. G. Romanov. 1999. Russian strategies for conservation and reproduction of rare and common Caspian sturgeon species. *Journal of Applied Ichthyology* 15: 191-192.
- Artyukhin, E. N. and A. G. Romanov. 2000. Old problem of a new fish farm. *Fish Culture and Fishing* 1: 14-16.
- Barannikova, I. A. 1998. Sturgeons and problems of their preservation. In: *Fisheries management in the Danube River Basin. Extended abstracts of contributions presented at the International Symposium* (May 12-18, 1998. Galati, Romania). M. Răută, N. Bacalbaşa-Dobrovici, G. Vasilescu and L. Oprea (eds.): 41-42. Universitatea Dunarea de Jos, Galati, Asociatia Pisciculturilor si Pescarilor din România.
- Barysheva, A. F. and O. N. Bauer. 1957. Parazity ryb Ladozhskogo ozera. *Izvestiya VNIORKH* 42: 175-226.

- Berg, L. S. 1935. O neobkhodimosti okhrany osetra v basseine Nevy. *Za rybnyuyu industriyu Severa* 7: 30-31.
- Berg, L. S. 1948a. Ryby Finskogo zaliva. *Izvestia VNIORKH* 23: 3-24.
- Berg, L. S. 1948b. *Ryby presnykh vod SSSR i sopredel'nykh stran*. Izdatel'stvo Akademii Nauk SSSR. Moscow-Leningrad: 466 pp.
- Borodin, A. M., A. G. Bannikov and V. E. Sokolov (eds.). 1984. *Krasnaya kniga SSSR. 1. 2nd ed.* Lesnaya Promyshlennost'. Moscow: 390 pp.
- Domrachev, P. F. and J. F. Pravdin. 1926. Ryby ozera Ilmen i reki Volkhova i ich khozjaistvennoe znachenie. *Materialy issledovaniy r. Volkhova i ego basseina* 10: 1-294.
- Jääskeläinen, V. 1917. Om fiskarna och fisket i Ladoga. *Finlands Fiskerier* 4 (1916-1917), Helsingfors 1917: 249-332.
- Kessler, K. 1864. *Opisanie ryb, kotorya vstrechayutsya v' vodakh S. -Peterburgskoi gubernii*. S. Peterburg': 240 pp.
- Kuderskii, L. A. 1983. Osetrovye ryby v basseinakh Onezhskogo i Ladozhskogo ozer. *Sbornik nauchnykh trudov GosNIORKH* 205: 128-149.
- Persov, P. 1935. Nevskoe rybolovstvo. *Za rybnyuyu industriyu Severa* 10: 38-41.
- Podushka, S. B. 1985. Atlanticheskii osetr pod ugrozoi. *Rybovodstvo* 5: 23.
- Pravdin, I. F. 1948. Osetrovye ryby v Ladozhskom i Onezhskom ozerakh. *Izvestiya Karelo-Finskoi nauchno-issledovatel'skoi bazy* 4: 73-79.
- Pravdin, I. F. 1949. *Promyslovye vodoemy i ryby Karelo-Finskoi SSR*. Gosudarstvennoe izdatel'stvo. Petrozavodsk: 86 pp.
- Vasil'ev, P. A. and F. I. Reznikov. 1955. Ob osetrakh v Belom more i Ladozhskom ozere. *Priroda* 8: 57-59.